Claims:

1.   A shaper for controlling a plurality of flows of
packets, comprising:

         a packet buffer for storing packets for each of the
flows of packets;

5   a content-addressable memory for storing a
plurality of scheduled transmission times at different
addresses each corresponding to the flows of packets;

         a timer counting a current time; and

         a current-time searcher for searching the
10 content-addressable memory for a scheduled transmission time
matching the current time to determine whether a packet to be
transmitted at the current time exists.

2.   A shaper for controlling a plurality of flows of
packets, comprising:

15   a packet buffer for storing packets for each of the
flows of packets;

         a content-addressable memory for storing a
plurality of scheduled transmission times, at each of which at
least one packet is to be transmitted;

20   a packet management table for storing linkage
information indicating a linkage of a plurality of packets that
are to be transmitted at a same scheduled transmission time;

a timer counting a current time;

a current-time searcher for searching the content-addressable memory for a scheduled transmission time matching the current time; and

5   a packet transmission controller for transmitting at least one packet at the scheduled transmission time matching the current time by referring to the packet management table.

3.   A shaper according to claim 2, further comprising:

a scheduler for calculating a transmission time of
10   an input packet based on its predetermined traffic;

a same-time searcher for searching the content-addressable memory to determine whether the calculated transmission time matches a scheduled transmission time that has been already registered in the content-addressable memory;
15   and

a transmission registration controller for adding the input packet to the linkage for the calculated scheduled transmission time in the packet management table, when the calculated transmission time matches a scheduled transmission
20   time that has been already registered in the content-addressable memory.

4.   A shaper according to claim 3, further comprising:

a data update controller for eliminating the scheduled transmission time matching the calculated

transmission time from entries to be searched for in the content-addressable memory.

5.   A shaper according to claim 4, wherein the data update controller removes a packet that has been transmitted

5   from a corresponding linkage stored in the packet management table.

6.   A shaper according to claim 4, wherein the data update controller uses a valid/invalid flag to determine whether a scheduled transmission time is eliminated from

10   entries to be searched for in the content-addressable memory.

7.   A shaper according to claim 3, wherein the transmission registration controller registers a flow number of the input packet into the content-addressable memory as an address of the content-addressable memory, when the calculated

15   transmission time does not match any scheduled transmission time of the content-addressable memory.

8.   A shaper according to claim 3, wherein the scheduler calculates a transmission time of an input packet so as to meet its predetermined traffic parameter.

20   9.   A scheduling method for use in a shaper controlling a plurality of flows of packets, comprising the steps of:

a) calculating a transmission time of an input packet based on its predetermined traffic;

b) searching a content-addressable memory to determine whether the calculated transmission time matches a

5 scheduled transmission time that has been already registered in the content-addressable memory;

c) when the calculated transmission time matches a scheduled transmission time that has been already registered in the content-addressable memory, adding the input packet to

10 a linkage for the calculated scheduled transmission time in a packet management table;

d) when the calculated transmission time does not match any scheduled transmission time of the content-addressable memory, registering a flow number of the input

15 packet into the content-addressable memory as an address of the content-addressable memory;

e) searching the content-addressable memory for a scheduled transmission time matching a current time at predetermined intervals; and

20 f) transmitting at least one packet at the scheduled transmission time matching the current time by referring to the packet management table.

10.   A scheduling method according to claim 9, further comprising the step of:

25 eliminating the scheduled transmission time

matching the calculated transmission time from entries to be

searched for in the content-addressable memory.

11.   A scheduling method according to claim 10, further

comprising the step of:

5   removing a packet that has been transmitted from

a corresponding linkage stored in the packet management table.

12.   A scheduling method according to claim 9, wherein

a transmission time of an input packet is calculated so as to

meet its predetermined traffic parameter.